Nos. 10-313 & 10-329

IN THE

Supreme Court of the United States

TALK AMERICA INC.,

Petitioner,

v.

MICHIGAN BELL TELEPHONE CO.,
D/B/A AT&T MICHIGAN,

Respondent.

ORJIAKOR N. ISIOGU, COMMISSIONER, MICHIGAN PUBLIC SERVICE COMMISSION, ET AL.,

Petitioners,

v.

MICHIGAN BELL TELEPHONE CO.,
D/B/A AT&T MICHIGAN,

Respondent.

ON WRITS OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SIXTH CIRCUIT

BRIEF *AMICI CURIAE* OF UNITED STATES TELECOM ASSOCIATION AND NETWORK ENGINEERS IN SUPPORT OF RESPONDENT

JONATHAN B. BANKS
UNITED STATES TELECOM ASSOCIATION
607 14th Street, N.W.,
Suite 400
Washington, DC 20005
(202) 326-7300

MEGAN L. BROWN
Counsel of Record
BENNETT L. ROSS
J. MICHAEL CONNOLLY
WILEY REIN LLP
1776 K Street, N.W.
Washington, DC 20006
(202) 719-7000
mbrown@wileyrein.com

Attorneys for Amici Curiae

234288

COUNSEL PRESS

(800) 274-3321 • (800) 359-6859

TABLE OF CONTENTS

TABLE OF CITED AUTHORITIES

Page

CASES

INTEREST OF *AMICI CURIAE*[1]

The United States Telecom Association ("USTelecom") is a trade association representing companies offering a wide range of services across communications platforms, including voice, video and data over local exchange, long distance, wireless, Internet, and cable services. USTelecom's members range in diversity from large, publicly traded companies to small rural cooperatives. USTelecom has an interest in the correct interpretation of federal communications law and regulation, which interpretation should account for the technical realities that confront the industry. In carrying out its mission, USTelecom unites the industry to advocate on priority issues before all branches of federal and state government, including the judiciary. USTelecom has litigated or filed amicus briefs in many of the key cases interpreting and applying provisions of the Communications Act.

Also participating as *amici curiae* are four telecommunications network engineers ("Network Engineers"). Network Engineers collectively have more than 120 years of experience in the telecommunications industry. Although they are not presently employed by any incumbent local exchange carrier, these engineers have held management positions with, among others,

1. Pursuant to Supreme Court Rule 37.6, *amici curiae* and their counsel drafted this brief. No party or counsel for a party authored this brief in whole or in part, and no such counsel or party made a monetary contribution to the preparation or submission of this brief. No person other than the *amici curiae* or their counsel made a monetary contribution to the brief's preparation or submission. All parties have consented to the filing of this brief and letters of consent have been lodged with the Clerk.

AT&T, Bell Atlantic, BellSouth, Qwest Communications, SBC, Southwestern Bell Telephone, and Verizon. They have been responsible for the planning, engineering, and operating of telecommunications networks as well as regulatory compliance and support. They also have witnessed first-hand how pivotal technology can be to regulatory classifications, which drive technology development, network deployment, and business operations. A list of engineers and their qualifications is set forth in the appendix hereto.

The legal questions in this case are intertwined with technical issues about telecommunications networks – how they are constructed and how they operate. While multiple courts have grappled with these issues, with the exception of the United States Court of Appeals for the Sixth Circuit, they have not always done so with technical precision. A decision that resolves this case based on an imprecise – or worse, incorrect – understanding of the underlying technical issues could have far-reaching, harmful effects on the telecommunications industry and the consumers it serves. *Amici Curiae* USTelecom and the Network Engineers share an interest in ensuring that the Court fully appreciates these underlying technical issues, which are neither self-evident nor simple. They thus respectfully offer this brief in an attempt to make these network issues more understandable to the Court.

SUMMARY OF THE ARGUMENT

The Court is no stranger to the Telecommunications Act of 1996, having been called upon to interpret the statute on several occasions.[2] Nor is the technology underlying today's telecommunications networks alien to the Court.[3]

Nonetheless, the issue in this case – the proper regulatory treatment of "entrance facilities" under the Act – requires a more detailed understanding of telecommunications network architecture. Lower courts have struggled with the technical aspects of the questions before them, and unfortunately, the technical descriptions of entrance facilities and the network diagrams offered by the petitioners obscure some important technical issues. The purpose of this brief is to explain certain technical concepts, in order to provide a more complete and helpful description of entrance facilities and their use in telecommunications networks.[4]

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2. *See, e.g., AT&T Corp. v. Iowa Utils. Bd.*, 525 U.S. 366 (1999); *Verizon Commcn's Inc. v. FCC*, 535 U.S. 467 (2002).

3. *See Verizon Commc'ns*, 535 U.S. at 490-91 (describing the "physical incarnation" of the local exchange market); *see also id.* at 541 (Breyer, J., dissenting in part) (offering an example of an incumbent local telephone company's major switching center "in downtown Chicago, from which cables and wires run through conduits or along poles to subsidiary switching equipment, other electronic equipment, and eventually to end-user equipment, such as telephone handsets, computer modems, or fax machines located in office buildings or private residences").

4. *Amici curiae* do this by reference to terms, concepts, and diagrams that have appeared or been discussed in this and other proceedings. The Network Engineers also provide practical

The brief also clarifies several important points that the petitioners and their *amici* in support misconstrue. Specifically, and notwithstanding their claims to the contrary, separate entrance facilities are not deployed for the purpose of exchanging traffic and backhauling. Likewise, backhaul does not merely involve the routing of traffic to and from a single carrier's customers; rather backhaul allows the placement of any kind of telephone call to any kind of customer. Finally, the deployment of entrance facilities, which can be miles in length, involves activities that are fundamentally different from the steps that an incumbent carrier must take to facilitate interconnection.

ARGUMENT

I. Introduction to the Local Telecommunications Network

A. Overview

As this Court correctly observed, the telecommunications network is analogous to a "transportation network for communications signals, radiating like a root system from a 'central office' (or several offices for larger areas) to individual telephones, faxes, and the like."[5] Each central office serves a wire center, which represents the local geographic territory of an incumbent local exchange carrier ("LEC").[6] Within

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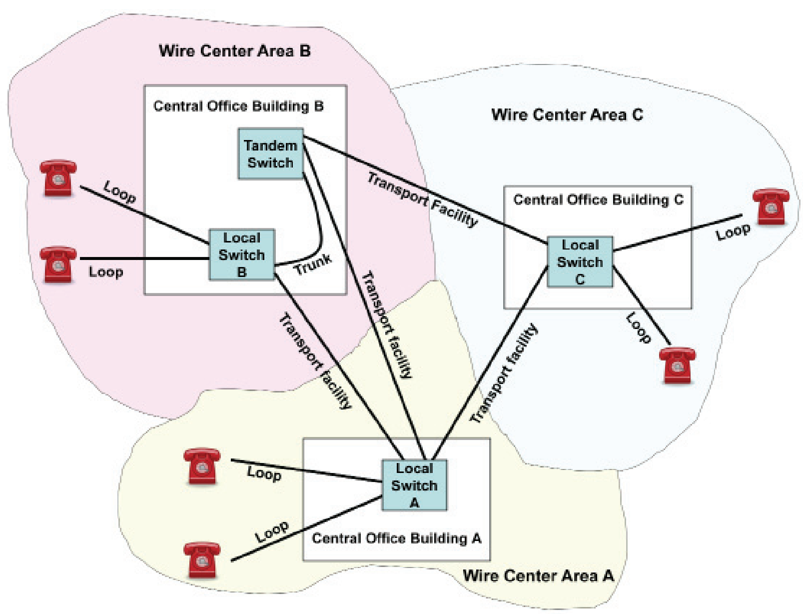
descriptions of various elements, practices and concepts based on industry standards and their professional experience.

5. *Verizon Commc'ns*, 535 U.S. at 491.

6. For example, the incumbent LEC or ILEC in the Washington, D.C. metropolitan area – Verizon – has approximately

each central office is the switching equipment, transport equipment, and cross-connect and power equipment used to serve the customers located within the wire center area. A local telephone customer obtains dial-tone on his or her telephone by means of a local loop connected to a local switch located in the wire center's central office.[7] All incumbent LEC customers located within the same wire center area have local loops connecting their homes or offices to the incumbent LEC's central office building serving that wire center area. Figure 1 is a diagram of an incumbent LEC's local telecommunications network.

FIGURE 1:
Incumbent Local Network



60 individual wire center areas in the Virginia, Maryland and Washington, D.C. area.

7. Each customer's "telephone number" resides on the local switch to which the customer's loop is connected.

Local Loop. In its simplest form, a local loop is physically a pair of wires running from the customer premises to the incumbent LEC's central office. A local loop may be made of copper wires (contained in a series of connected copper cables) for its entire length from the customer's premises to the central office. A local loop also may be a combination of copper wires and fiber optic strands. In this arrangement, copper wires connect the customer's premises to a digital loop transport (carrier) system that converts multiple copper lines (analog) into a digital format, combines (multiplexes) them together, and transports them to the central office over high capacity transport facilities, which typically consist of fiber optic cables.[8]

Local Switch. The local switch (also referred to as an end office switch) provides dial-tone to the customer's telephone using a loop facility (*i.e.,* dial-tone loop). It also provides various calling features such as three-way calling, call forwarding, and call waiting. The local switch interprets the digits dialed by the customer and makes call connections to other customers served by that same switch. Local switches are connected by interoffice circuits referred to as "trunks" that allow telephone calls to be completed to and from customers in different wire centers and served by different central offices.[9]

8. *See, e.g.,* Telcordia Notes on the Networks, Telcordia Technologies Special Report, SR-2275, Issue 4, §§ 12.1.1, 12.13, 12.6 & 12.7 (Oct. 2000) ("*Telcordia Notes*"). Alternatively, a local loop may consist entirely of fiber optic strands, an arrangement often referred to as "fiber-to-the-home."

9. *See, e.g., id.*, § 4.1.3.1. The function of completing calls to and from customers served by other switches is referred to as "routing" or "call routing."

Trunk. A trunk is a circuit that connects two switches. A switch makes the connections between the loops and trunks that it serves. For example, in Figure 1, for a call from a customer in wire center A to a customer in wire center B, the local switch in wire center A would establish a connection from the originating dial-tone loop to a trunk connecting local switch A to local switch B; the switch in wire center B would complete the call connection by connecting the incoming trunk from local switch A, to the dial-tone loop of the customer served by local switch B. A single trunk is used for one phone call for the duration of that call. When the telephone call is concluded, the trunk is released for use for the next call from a customer served by local switch A to a customer served by local switch B. For a telephone call between two customers served by the same local switch, no interoffice trunk is used.[10]

Tandem Switch. A tandem switch is a "specialty" switch that only makes connections between trunks and other switches. A tandem switch does not directly serve customers who originate or terminate calls. Instead, the tandem switch handles the intermediary function of connecting trunks carrying calls originated and terminated in other switches. In Figure 1, a tandem switch is shown located in Central Office B. In a local calling area with many local switches, a local switch may not have trunk connections directly to all the other local switches because low traffic volumes do not justify such direct connections. In this situation, a tandem switch is used for completing calls when direct trunks between a specific pair of switches do not exist. For example, in Figure 1, there are no direct trunks between local switch B and local switch C. In this case, a phone call from a

10. *See, e.g., id.*, §§ 4.1.3.1, 4.1.3.7 & 7.2.1.4.

customer served by local switch B to a customer served by local switch C would be made using a trunk from local switch B to the tandem switch. The tandem switch would complete the connection (call path) between its trunk from local switch B and its trunk to local switch C and the customer served by local switch C. Additionally, tandem switches are also used for alternate call completion paths between a pair of switches if the direct trunks between that pair of switches are all temporarily busy (that is, are in use for other calls).[11]

Trunk Group. A trunk group is a homogenous quantity of trunks (typically in building blocks of 24 trunks) between two specific switches that are configured to operate together. For example, a trunk group of 96 trunks between two local switches would be capable of handling up to 96 simultaneous voice telephone calls between customers served by those switches. In an incumbent LEC's local network, particularly between a local switch and a tandem switch, the network may be configured with more than one trunk group between the same pair of switches. When this occurs, the different trunk groups are typically set up to carry different types of calls. For example, one trunk group would be used only for local calls, while the other trunk would be used only for long distance calls.[12]

Signaling Equipment. Generally speaking, signaling is the exchange of control information (dialed digits, customer billing numbers, and the like) used to set up and take down calls between switching systems. Older vintages

11. *See, e.g., id.*, § 4.1.3.3.

12. *See, e.g., id.*, § 4.1.3.1.

of signaling used the same circuit that would ultimately carry the call to convey signaling information. Modern switching systems use a signaling system (typically Signaling System 7 or "SS7") in which the signaling information is conveyed in separate pathways from the voice traffic. With SS7, also referred to as Common Channel Signaling ("CCS"), signaling information is conveyed without first using the trunk over which the call will be placed, which increases performance, reduces costs, and facilitates various calling services.[13]

B. Interconnection of Telecommunications Networks

Customers served by different telecommunications carriers cannot place telephone calls to one another unless the networks of the carriers serving those customers are interconnected. Interconnection is the physical linking of two carriers' networks for the mutual exchange of traffic (that is, telephone calls).[14] Historically, carriers were under no legal obligation to interconnect their networks.[15] However, beginning in 1970, relying upon its authority granted under the Communications Act, the Federal Communications Commission steadily expanded the

13. *See, e.g., id.*, § 6.2.3.

14. First Report and Order, *Implementation of the Local Competition Provisions in the Telecomms. Act of 1996*, 11 F.C.C.R. 15,499, 15,590, ¶ 176 (1996) ("*Local Competition Order*").

15. *See, e.g., Home Tel. Co. v. People's Tel. & Tel. Co.*, 141 S.W. 845, 848 (Tenn. 1911) (noting that, while telephone and telegraph companies are common carriers, "this does not mean that a telephone company is bound to permit another telephone company to make a physical connection with its lines").

interconnection obligation for various services, including long distance and wireless.[16]

Before the advent of competition in the local exchange market, incumbent LECs' local networks were interconnected to the networks of long distance carriers or interexchange carriers ("IXCs"), which permitted the origination and termination of long distance calls to and from the incumbent LEC's local customers. Long distance carriers operate what is called a Point of Presence ("POP"), which is analogous to the incumbent LEC's central office. A long distance carrier's POP may contain both the physical switching and transport equipment owned by the carrier, or may only contain transport equipment that is connected to the long distance carrier's switch that physically resides in a different (distant) location.[17] Interconnection with a long distance carrier's switch is accomplished by building trunk groups from

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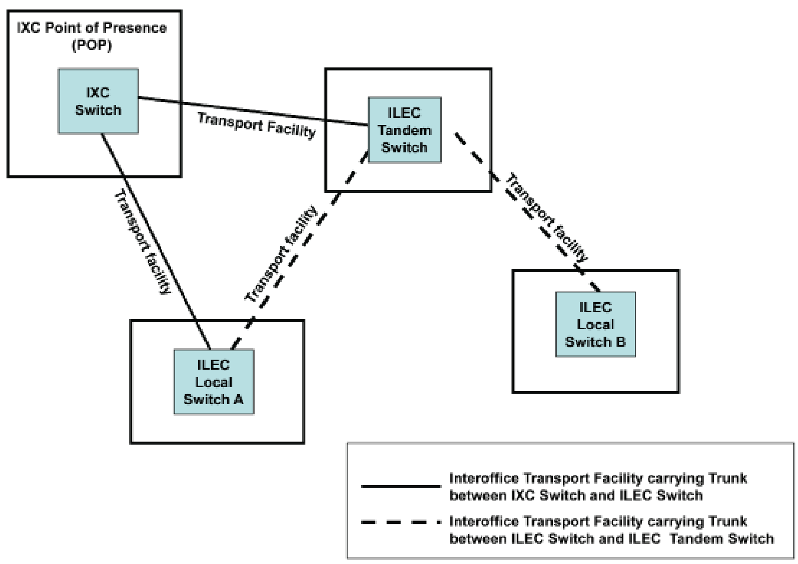
16. *See, e.g.,* Notice of Inquiry to Formulate Policy, Notice of Proposed Rulemaking and Order, *Establishment of Policies and Procedures for Consideration of Applications To Provide Specialized Common Carrier Services in the Domestic Public Point-to-Point Microwave Radio Service and Proposed Amendments to Parts 21, 43 and 61 of the Commission's Rules*, 24 F.C.C.2d 318, 347, ¶ 67 (1970) ("If access to local facilities is requested and needed by the applicants, we would expect the local carrier . . . to permit interconnection or leased channel arrangements on reasonable terms and conditions to be negotiated with the new carriers."); Decision, *Bell System Tariff Offerings of Local Distribution Facilities for Use by Other Common Carriers*, 46 F.C.C.2d 413, 422, ¶ 16 (1974), *aff'd sub nom. Bell Tel. Co. of Pa. v. FCC*, 503 F.2d 1250 (3d Cir. 1974); Report and Order, *An Inquiry into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems*, 86 F.C.C.2d 469, 496, ¶¶ 55, 57 (1981).

17. *See, e.g., Telcordia Notes*, § 4.1.4.

that switch to the incumbent LEC's tandem switch and, if a long distance carrier so chooses, from the switch to one or more of the incumbent's local (end office) switches. Figure 2 is a diagram of direct interconnection between an incumbent LEC's local network and the network of a long distance carrier.[18]

FIGURE 2:
ILEC Interconnection with Interexchange Carrier (IXC)



18. As depicted in Figure 2, the IXC has trunks riding on the transport facilities to the incumbent's tandem switch as well as trunks to the incumbent's local switch A but no direct trunks to the incumbent's local switch B. In this arrangement, long distance calls to or from the incumbent's customers served by local switch B would only be sent (routed) to the long distance carrier through the incumbent's tandem switch. An IXC typically has trunks to each incumbent's tandem switch in each LATA (Local Access and Transport Area), which are geographic areas created by the

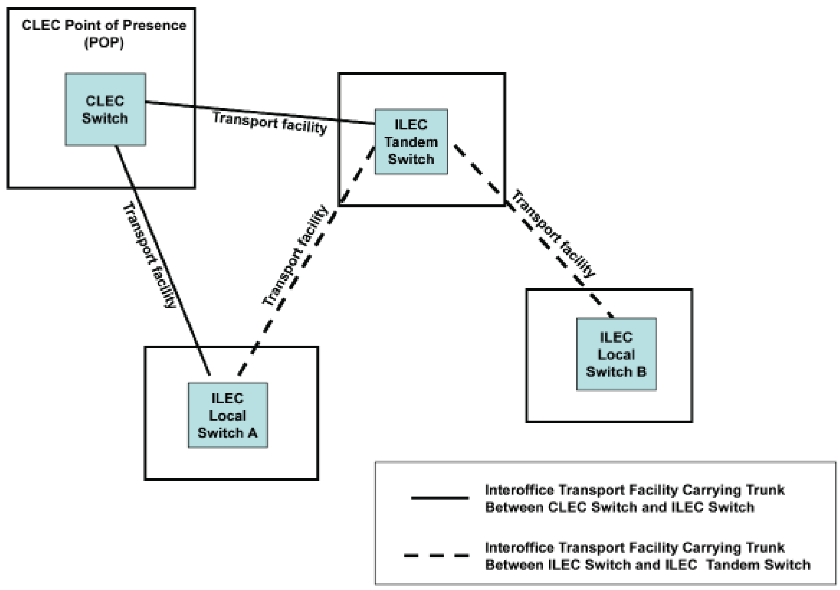
With enactment of the 1996 Act, and the opening of the local market to competition, competitive local exchange carriers (also referred to as competing LECs or "CLECs") were given the right to interconnect their networks with the incumbents' networks.[19] As is the case with long distance carriers, a competing LEC operates a POP that may contain its physical switching and transport equipment or just transport equipment that is connected to the competing LEC's switch physically residing elsewhere. The technical arrangements used to accomplish interconnection between a competing LEC's switch and the incumbent's central office are very similar to the technical arrangements used to interconnect a long distance carrier's switch and the incumbent's central offices. Figure 3 is a diagram of direct interconnection between an incumbent LEC's local network and the network of a competing LEC.[20]

Modification of Final Judgment. *See United States v. AT&T*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub. nom. Maryland v. United States*, 460 U.S. 1001 (1983); *United States v. W. Elec. Co.*, 569 F. Supp. 990 (D.D.C. 1983). However, depending upon call volume and other factors, the IXC could choose to have direct trunks to some, all, or none of the incumbent's local switches in a LATA.

19. *See* 47 U.S.C. §§ 251(a), 251(c)(2). The use of the term "CLEC" in this context also includes providers of Commercial Mobile Radio Service ("CMRS"). *See Local Competition Order* at 16,000, ¶ 1015.

20. Under 47 U.S.C. § 251(a), a competitor has the option to interconnect "indirectly" with an incumbent LEC. When two carriers interconnect indirectly, there is no immediate physical connection between their networks. Rather, each carrier's network is connected to the network of a third carrier that serves as an intermediary between the originating and terminating carriers.

Figure 3:
ILEC Interconnection with Competitive Local Exchange Carrier (CLEC)



The location that represents the actual point where the network of one carrier (for example, a competing LEC) is physically connected to the network of another carrier (for example, an incumbent LEC) is called the point of interconnection ("POI").[21] FCC rules implementing the 1996 Act provide that each carrier is responsible for maintaining and operating the physical facilities and equipment on its respective "side" of the POI.[22] At the POI, connections generally referred to as "cross-connects" are made to physically link the networks. Cross-connects may be made between copper wires owned by the competing

21. *See, e.g., MCImetro Access Transmission Servs., Inc. v. BellSouth Telecomms., Inc.*, 352 F.3d 872, 875 (4th Cir. 2003).

22. *See* 47 C.F.R. § 51.701.

LEC to copper wires owned by the incumbent, or between a coaxial cable owned by the competing LEC to a coaxial cable owned by the incumbent, or between a fiber optic strand owned by the competing LEC to a fiber optic strand owned by the incumbent. The different possible physical media (copper wire, coaxial cable, or fiber optic cable) are a function of the speed and nature (e.g., analog format or digital format) of the signals transmitted over the particular medium. Typically, the POI and the necessary cross-connect hardware equipment needed to make the physical connections are located inside the incumbent's central office.

C. Digital Transport Systems and Fiber Optics

Beginning with Alexander Graham Bell, a telephone call was transmitted as a continuously modulated (analog) electrical signal over a pair of copper wires. With the advent of digital technology, it became more cost effective to convert analog signals to digital signals (a stream of 0's and 1's), combine the digital signals from a number of analog lines, and transport the combined digital signals over a greater distance. At the distant end, the digital signals are uncombined and converted back into individual analog signals, at which point each individual call would typically travel over a single pair of copper wires to be completed.

The electronic equipment that converts signals from analog format to digital format and combines and uncombines the digital signals is called a multiplexer (often referred to as a "mux"). A digital transport system typically includes a pair of multiplexers (each located at different, distant locations) connected and dedicated to each other. The digital transport system transmits combined digital signals between the pair of connected multiplexers, as the individual analog signals enter and exit the multiplexers at each end.

In North America, standards evolved such that the analog signal for one voice grade telephone call is converted into a digital signal operating at a speed of approximately 64,000 bits/second. This 64 kilobits per second (64 kbps) signal is referred to as a Digital Signal – Level 0 ("DS-0") signal. A related "digital hierarchy" was developed to standardize the digital building blocks for combining and uncombining digital signals. In this hierarchy, the signals for 24 analog lines (or 24 telephone calls, or 24 DS-0s), are combined into a single digital signal called a DS-1. The speed (bandwidth) for a DS-1 is approximately 1.5 megabits/second. The standard for the next step – the combining of DS-1s – is a DS-3. A DS-3 accommodates 28 DS-1 signals multiplexed together. The speed (bandwidth) for a DS-3 is approximately 45 megabits/second. A single DS-3 can carry 28 DS-1s, or 672 simultaneous telephone lines/calls (*i.e.*, 24 x 28). DS-1 and DS-3 digital circuits (as well as larger capacity circuits) are often referred to as "pipes," since they carry multiple digital signals.

Starting in the 1980s, incumbents began deploying digital transport systems over fiber optic facilities and continued to do so extensively, as the technological capacity and capabilities of these systems expanded dramatically. A Fiber Optic Transport System is made up of fiber optic multiplexers (sometimes referred to as fiber optic terminals) connected together by glass fiber optic strands. In an incumbent LEC's local network, fiber optic cables (containing the fiber optic strands) are deployed both in the loop portion of the network, as well as in the interoffice network, where the fiber optic cables run between the incumbent LEC's central office buildings. In a broad sense, fiber optic multiplexers are similar to the early digital multiplexers. Lower speed (capacity) electrical and optical digital signals enter the fiber optic multiplexer, are combined into a higher speed (higher capacity) digital fiber optic signal, which is then transmitted as a high speed digital light (optical) signal between the fiber optic multiplexers connected together in the Fiber Optic Transport System. At each fiber optic multiplexer location, lower speed electrical and optical signals may be combined or uncombined as they enter or exit the Fiber Optic Transport System.

Synchronous Optical Network or "SONET" standards refer to a set of standards developed for the interoperability of different Fiber Optic Transport Systems. SONET standards include an "optical digital hierarchy" standardizing the building blocks for combining and uncombining optical circuits. In the SONET hierarchy, an OC-1 (Optical Channel 1) digital optical circuit is roughly equivalent to a DS-3 digital electrical circuit. Further steps in the optical hierarchy are the OC-3, OC-12, OC-48, etc. Using these building blocks, an OC-48 SONET Fiber Optic Transport System, for example, operating at an overall digital signal speed of about 2.5 gigabits per second, would carry the capacity of 48 DS-3s between the fiber optic multiplexers in the system, or the equivalent of 32,256 simultaneous analog telephone calls/lines.[23]

Because of the standard building blocks for combining and uncombining electrical and optical digital signals, and its extremely large capacity, a Fiber Optic Transport System usually carries an aggregation of numerous

23. *See, e.g., Telcordia Notes*, § 14.15.

individual circuits from a large number of different origination and termination points. Typically, a Fiber Optic Transport System simultaneously carries trunks to various carrier switches (incumbent, competing, and long distance carriers) and a variety of non-switched point-to-point circuits (for example, circuits for non-switched DS-1 and DS-3 services). In a sense, the Fiber Optic Transport System is like a large multi-lane interstate highway, with the circuits (pipes) on that system representing lanes on the highway that carry a wide variety of types and sizes of traffic; multiplexers are analogous to the interchanges where varied traffic smoothly enters and exits the high capacity system.

In the incumbent's local network, interoffice Fiber Optic Transport Systems are configured between central office buildings using a number of different physical architectures. These architectures may include rings, point-to-point, and hub and spoke configurations. Consequently, an individual DS-1 or DS-3 interoffice circuit may traverse multiple Fiber Optic Transport Systems between the circuit's origination point and its termination point.[24] For example, in Figure 1, a DS-1 trunk group between local switch A and local switch C may be transported first over a fiber optic system using glass strands in a fiber optic cable running from central office A to central office B, and then over another fiber optic system using glass strands in a fiber cable running from central office B to central office C. Back to the interstate highway analogy, this would be like driving on I-495 and then I-395 to go from Northern Virginia to downtown Washington D.C.

24. *See, e.g., id.*, § 14.15.3.1-.6.

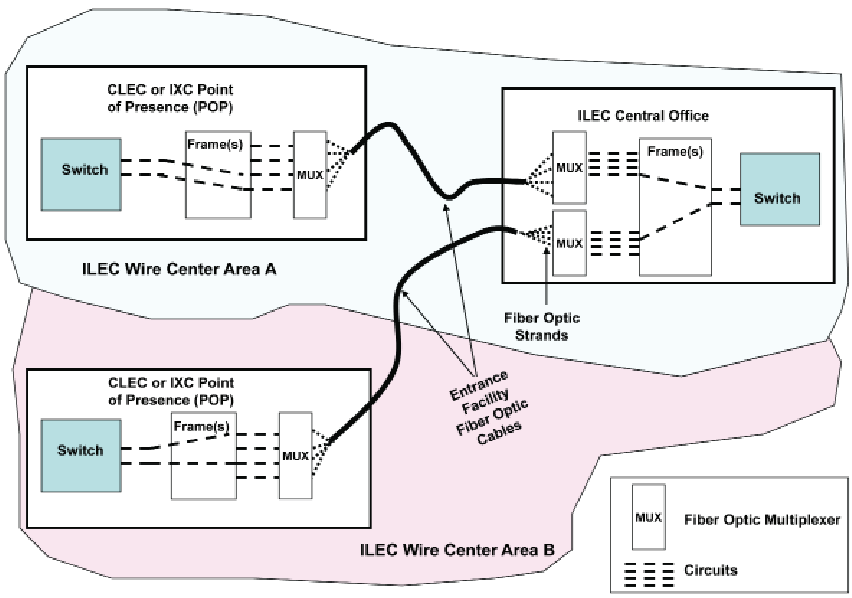
D. Entrance Facilities

An entrance facility is a dedicated fiber optic transport system connecting a competing LEC's POP to an incumbent's central office.[25] An entrance facility consists of a fiber optic cable containing fiber strands that extends between the competing LEC's POP and the incumbent's central office and connects to a pair of SONET fiber optic multiplexers, one located at the competing LEC's POP and the other inside the incumbent's central office.

In essence, an entrance facility is the first (or last) transport link for numerous and various longer circuits running from the competing LEC's POP. The entrance facility aggregates together and transports these different individual circuits between the competing LEC's POP and the incumbent's central office. The entrance facility typically terminates at a location in the incumbent's central office that allows circuits riding the entrance facility to fan out to different destinations (end points) throughout the incumbent's local network. As a result, an entrance facility will frequently carry trunks bound for different incumbent local switches, trunks to other carrier switches, as well as various non-switched circuits – all across the same dedicated transport system. Figure 4 is a diagram of typical competing LEC entrance facility.

25. Long distance carriers also use entrance facilities to connect to an incumbent LEC's central office and entrance facilities may be used to connect buildings or office campuses, but this discussion focuses on the use of entrance facilities by competing LECs given the issues before the Court. *See* 47 C.F.R. § 69.2(qq) (defining "entrance facilities" as "transport from the interexchange carrier or other person's point of demarcation to the serving wire center").

FIGURE 4:
Entrance Facility



The length of an entrance facility can vary considerably and is a function of the location of the POP where the competing LEC has elected to place its equipment relative to the incumbent's central office. Generally, most entrance facilities are less than five miles in length, although some can be considerably longer. Where the incumbent's central office and competing LEC's POP are located in close proximity, an entrance facility can be less than the length of a single city block.

As a point of reference, Figures 5 and 6 are maps of the Atlanta, Georgia metropolitan area and the Atlanta downtown sector, respectively.[26] These maps depict the location of AT&T's central office on Courtland Street in Atlanta (where AT&T is the incumbent) as well as the location of various competing LEC switches. Because the Courtland Street central office is located in the downtown Atlanta business district, many competing LECs connect their switches to the Courtland Street central office. As reflected on Figures 5 and 6, the length of an entrance facility necessary to connect each of the competing LEC's switches to the Courtland Street central office could vary from almost one city block to nearly 18 miles.[27]

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26. Figures 5 and 6 were prepared by GeoResults, a national telecommunications database marketing and consulting firm. GeoResults maintains the GeoSwitch™ Database, which is a national listing of all building locations that it has identified as having one or more wireline telecommunications switches. Figures 5 and 6 do not include switches of CMRS providers in the Atlanta area.

27. One competing LEC's switch is collocated in AT&T's Courtland Street central office. Collocation, which is a method of interconnection, does not require ILEC-provided entrance facilities. In addition, for those competing LEC switches located in the outlying locations from downtown Atlanta, the competing LEC may elect to use entrance facilities to connect to the nearest AT&T central office and rely upon AT&T's interoffice transport to reach from that central office to AT&T's Courtland Street central office.

FIGURE 5:
CLEC Switch Locations —
Metro Atlanta

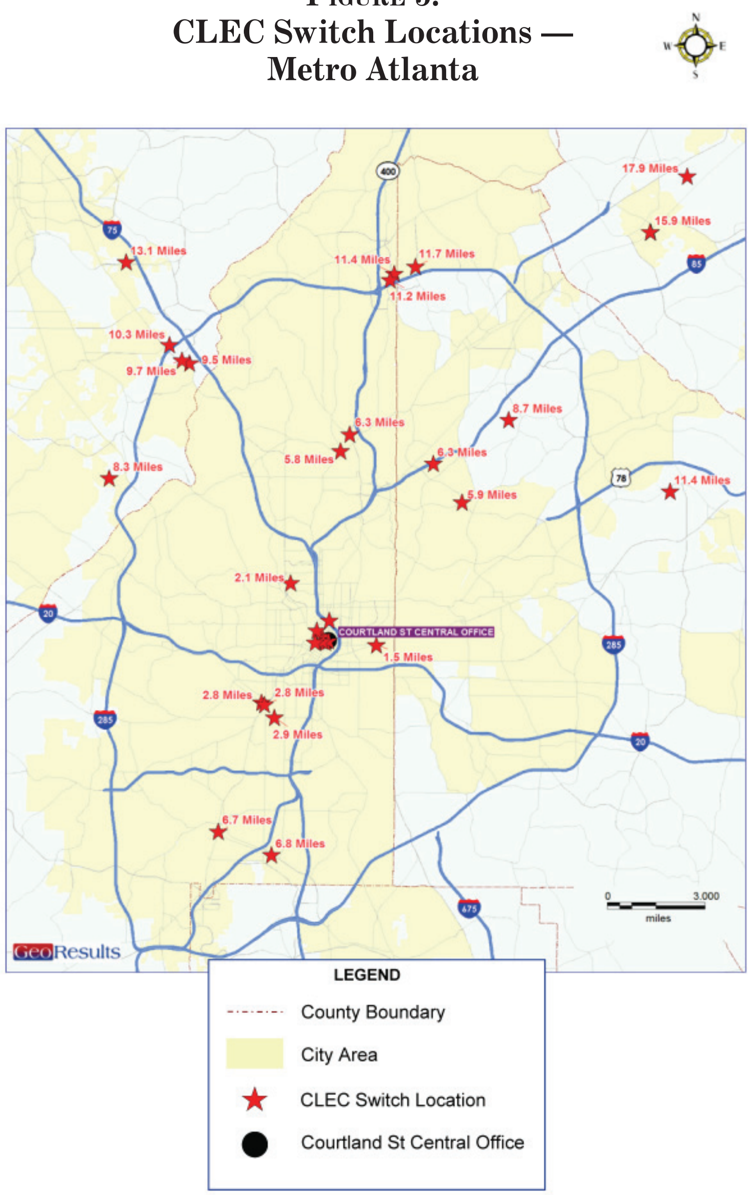
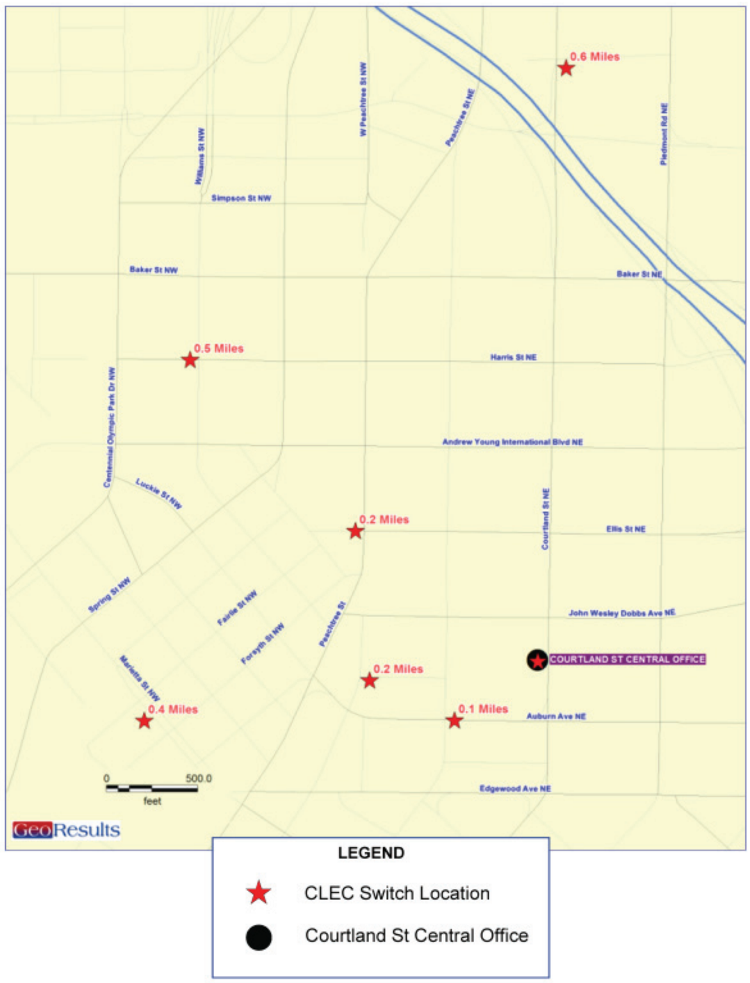


FIGURE 6:
CLEC Switch Locations —
Downtown Atlanta



A competing LEC can construct entrance facilities itself or obtain them from the incumbent or a third party.[28] The construction of new entrance facilities where such facilities do not presently exist is a costly and time-consuming exercise, whether the construction is done by the CLEC, the ILEC, or a third party. For example, one incumbent LEC's typical interval for deploying new entrance facilities is 120 business days, provided that the incumbent has fiber optic cables already located near the competing LEC's POP. Even longer intervals are involved if significant additional fiber cable construction is required.

Although not exhaustive, the following work activities generally are required when the incumbent deploys a new entrance facility (some of which are performed by the competitor): (i) preparing environmental building space at the competing LEC's POP; (ii) placing or expanding cross-connect equipment at the competing LEC's POP, which may include additional cable or equipment racking and riser cable facilities; (iii) installing and constructing power equipment and power connections to operate the multiplexer at the competing LEC's POP; (iv) designing and engineering the Fiber Optic Transport System based on a service forecast provided by the competing LEC; (v) constructing the fiber transport system from the incumbent's central office to the competing LEC's POP, which may require obtaining various permits to the extent that work in the public rights of way is required;

28. *See* Order on Remand, *Unbundled Access to Network Elements; Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, 20 F.C.C.R. 2533, 2610, ¶138 (2005) ("*Triennial Review Remand Order*").

(vi) ordering fiber optic multiplexers from the equipment vendor; (vii) installing the fiber optic multiplexers after delivery; (viii) splicing the fiber optic cable segments from the incumbent's central office to a location near the competing LEC's POP; (ix) splicing or placing fiber optic cables into the competing LEC's POP; (x) placing and splicing intra-building fiber optic cables by the incumbent within the competing LEC's POP to reach the exact location of the fiber optic multiplexer; (xi) testing and turning up both fiber optic multiplexers (in the incumbent central office and the competing LEC's POP) as a single system; and (xii) installing alarm and monitoring circuits to the system (for remote surveillance and operations).

Some of these activities may be performed in parallel, although a number of them must be performed sequentially.[29] The same activities are required if the competing LEC or a third party is deploying the new entrance facility.

Once construction of a new entrance facility is complete, additional work would be required to install the various individual circuits that are transported across the entrance facility. For example, a competing LEC could order from the incumbent DS-3 and DS-1 transport circuits for service and the trunks that ride on those DS-3 and DS-1 circuits. Upon receipt of these service orders, the incumbent would place additional electronic equipment

29. For example, fiber optic multiplexers cannot be activated and tested until a complete fiber optic path is constructed from the competing LEC's POP to the incumbent's central office, and fiber optic multiplexers cannot be installed in the competing LEC's POP until HVAC, structural loads, fire suppression, electrical bonding and grounding, floor space, and power is available.

on either end of the entrance facility in order to activate the required circuits and trunks.

An entrance facility is not the only method to provide the "transport link" between a competing LEC's POP and an incumbent's central office. Another method is meet point interconnection, which involves both the competing LEC and the incumbent LEC building their own fiber optic cables to an intermediate location between the competing LEC's POP and the incumbent's central office. Fiber strands from the competing LEC's fiber optic cable are connected to fiber strands from the incumbent's fiber optic cable at this intermediate location. Both the competitor and incumbent bear their own costs of deploying the fiber optic cables (and the strands therein) on their respective side of the intermediate location and the fiber multiplexer located at their respective end of the fiber optic transport system. The meet point fiber optic transport system is then operated jointly by the competitor and the incumbent.[30]

E. Backhaul

The need for backhaul typically arises when a competitor leases an unbundled loop from the incumbent but provides the customer served by that loop with dial tone from the competitor's switch located elsewhere. Backhaul occurs when a competitor's customer's dial-tone line connection (that is, the circuit from the customer's premises to the competitor's switch) is transported across

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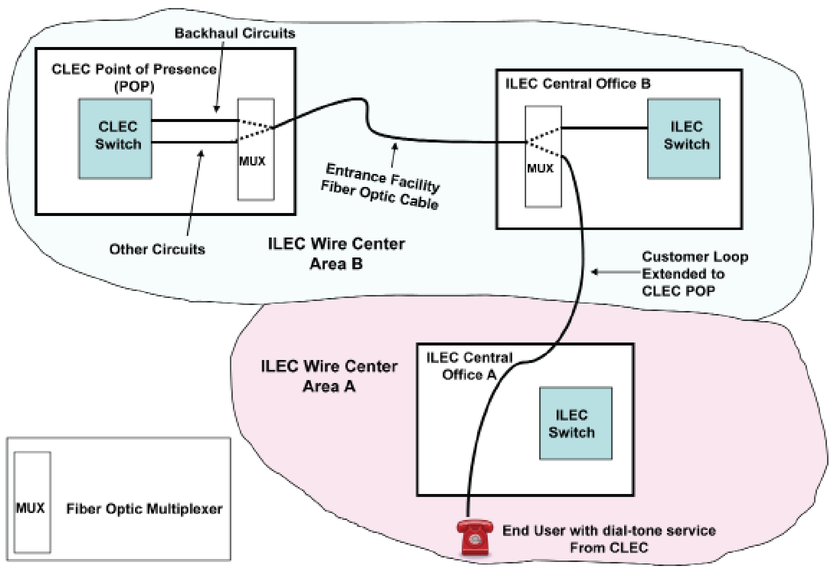
30. According to the FCC, unless the parties agree otherwise, the point of interconnection in a meet point arrangement is a point inside the incumbent's central office – such as on the incumbent's "main distribution frame" or "trunk-side of the switch." *Local Competition Order* at 15,781, ¶ 553.

an entrance facility connecting the incumbent's central office to the competitor's POP. Figure 7 is a diagram of typical backhaul arrangement.

FIGURE 7:
Backhaul Arrangement



In Figure 7 the competitor's customer is located in the incumbent's wire center A. The competitor's switch that provides dial tone to this customer is located in its POP, which is in incumbent wire center area B. The competitor's customer's dial-tone line connection from the customer's premises to the competitor's switch runs through the incumbent's central office A, to the incumbent's central office B, where it is connected in the incumbent's central office B to the entrance facility running from the incumbent's central office B to the competitor's POP.

What distinguishes Figure 7 as a backhaul arrangement is that the competitor's customer's dial-tone line connection is transported across the entrance facility from the incumbent's central office B to the competitor's switch located in its POP. The entrance facility that provides the "backhaul link" for the competitor's dial-tone customer in wire center area A is the same Fiber Optic Transport System (i.e., the same fiber multiplexers and fiber cables) that also transports trunks from the competitor's switch to the incumbent's switches, transports trunks from the competitor's switch to the switches of other carriers, and transports non-switched circuits to and from the competitor. All of these circuits and services are aggregated together across the same entrance facility.

II. Clarification of Network Issues

Against this technical backdrop, the petitioners and their *amici* in support misconstrue several important points regarding entrance facilities. The same is true of those appellate courts that have held that incumbents must provide entrance facilities under 47 U.S.C. § 251(c)(2).

A. Separate entrance facilities are not deployed for the exchange of traffic and backhaul purposes.

In their filings and as reflected in diagrams submitted with or referenced in their briefs, the petitioners erroneously suggest that different entrance facilities exist to accommodate separately interconnection and backhaul.[31] From a network engineering (and cost) standpoint, the same fiber optic cable that contains the fiber strands and the pair of multiplexers comprising the entrance facility is installed and used for both interconnection and backhaul. The same fiber cable and multiplexer pair that transport trunks to and from various carrier switches (interconnection) also would transport competing LEC customers' dial-tone line connections across the entrance facility (backhaul). Given the time and expense of deployment, it is almost inconceivable from a network design (and cost) standpoint that an entrance facility would ever be deployed "solely for backhauling."[32]

That the same entrance facility is used both for interconnection and backhaul underscores a pricing problem that neither the petitioners nor their supporting *amici* address. That is, under their view, an incumbent LEC would be required to provide an entrance facility to a competing LEC at rates established under the Total Element Long Run Incremental Cost (TELRIC) methodology when the CLEC ostensibly seeks to use the entrance facility for interconnection purposes. However, once the incumbent has designed, engineered, and constructed the fiber transport system and installed and

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31. *See, e.g.,* Michigan Public Service Commission Br. at 23 (providing a diagram that depicts two separate entrance facilities, one for backhaul and the other for interconnection); California Public Utilities Commission Br., Appendix 1 (same); Talk America Br. at 26.

32. Michigan Public Service Commission Br. at 21; *see also* COMPTEL Br. at 16 (claiming that "the CLEC is entitled to TELRIC pricing" when the entrance facility is "used for the transmission and routing" of traffic "between the ILEC and the CLEC" but not when that facility is used for backhauling).

activated the fiber optic multiplexers, the competing LEC could readily establish circuits for backhaul purposes that would ride that same TELRIC-priced entrance facility. Thus, while readily acknowledging that competing LECs should not be able to obtain an entrance facility at TELRIC when used for backhaul, the petitioners and their supporting *amici* ignore that this would be the inevitable result if the Court were to agree with their position in this case.

It is no answer to argue, as the California Public Utilities Commission erroneously does, that an incumbent can prevent, on a call-by-call basis, the use of an entrance facility for backhaul purposes.[33] An incumbent has no such capability. Calls made by competing LEC's customers whose dial-tone line connections to its switch are backhauled across an entrance facility never touch an incumbent's switch before those calls reach the competing LEC's switch. The incumbent is not involved in the routing of their calls. Under these circumstances, the incumbent cannot detect, let alone screen out, individual calls that involve backhaul on an entrance facility.

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33. *See* California Public Utilities Commission Br. at 6-7; *see also Illinois Bell Tel. Co. v. Box*, 526 F.3d 1069, 1071-72 (7th Cir. 2008) ("The state commission tells us that ILECs can detect and block any attempted use of an entrance facility for backhauling. (Every carrier, ILEC or CLEC, must be able to determine the traffic's destination in order to route it accurately.)"); *Pacific Bell Tel. Co. v. Cal. Pub. Utils. Comm'n*, 621 F.3d 836, 842 n.8 (9th Cir. 2010) ("Incumbent LECs are capable of screening out calls that would be used for backhauling. A computer identifies the destination of the call, and, if the call is bound for a customer of the competitive LEC, the computer can screen out the call."), *petition for cert. pending*, No. 10-838 (filed Dec. 23, 2010).

Equally unsatisfactory is the government's attempt to blunt the regulatory arbitrage that would inevitably result if the petitioners were to prevail by seeking to limit this case to "existing" entrance facilities.[34] As Michigan Bell correctly notes, neither the underlying state commission order at issue nor the petitioners ever acknowledge, let alone embrace, this limitation.[35] Indeed, the government's distinction between existing and new entrance facilities is not endorsed by the California Public Utilities Commission – a state commission that has required incumbents to provide entrance facilities at TELRIC rates under section 251(c)(2) in a decision affirmed by the Ninth Circuit.[36] According to the California Commission, that requirement applies to "existing or new" entrance facilities.[37]

Furthermore, the government's reasoning is nonsensical. On the one hand, the government insists that incumbents should be required to provide *existing* entrance facilities at TELRIC rates because doing so is allegedly consistent with FCC and court decisions interpreting section 251(c)(2) to require incumbents under certain circumstances to "construct[] new facilities where none already exist."[38] On the other hand, the government argues that incumbents are not required to construct *new* entrance facilities where none exist because the FCC has yet to "rule" whether section 251(c)(2) imposes such

34. United States Br. at 25 n.7.

35. Michigan Bell Br. at 51.

36. *See Pacific Bell*, 621 F.3d 836.

37. California Public Utilities Commission Br. at 22.

38. United States Br. at 23.

an obligation.[39] This reasoning also overlooks that the "existing" entrance facilities at issue have been provided by the incumbent at TELRIC rates only because they were constructed at a time when the FCC's rules required that entrance facilities be "unbundled" under section 251(c)(3) – rules subsequently adjudged to be unlawful. Thus, under the government's reasoning, competing LECs would continue to enjoy the benefit of TELRIC rates for existing entrance facilities constructed by the incumbent under an unlawful regulatory regime, while competing LECs would not be entitled to TELRIC rates for new entrance facilities requested under the current regulatory regime.

B. Backhaul does not just involve the routing of traffic from one competing LEC customer to another.

The petitioners erroneously claim that backhaul only involves the routing of traffic from one competing LEC customer to another.[40] The United States Courts of Appeals for the Seventh and Ninth Circuit made a similar error.[41] The reasoning underlying this claim appears to

39. *Id.*

40. *See, e.g.,* Michigan Public Service Commission Br. at 8-9, 21, 22, 24-25, 29, 35; Talk America Br. at 23, 26 (referring to backhaul as a CLEC "carry[ing] traffic to and from its end users"); *cf.* California Public Utilities Commission Br. at 5 (stating that backhaul involves the use of an entrance facility "to route traffic to and from a CLEC's end users located in the ILEC's service territory").

41. *Illinois Bell*, 526 F.3d at 1071 ("Using an entrance facility to move voice or data traffic among CLEC customers has come to be known as 'backhauling,' . . ."); *Pacific Bell*, 621 F.3d at 842 ("In the case of backhauling, the competitive LEC uses the entrance

be that competing LECs should be entitled to obtain entrance facilities at TELRIC rates when they are used for interconnection because multiple carriers (and their customers) benefit from the arrangement; by contrast, a competing LEC is not entitled to obtain entrance facilities at TELRIC prices when they are used for backhaul because it only benefits the competing LEC (and its customers).[42] This reasoning is misguided for two reasons.

First, as noted above, the same entrance facility (transport system) is used both to exchange traffic and for backhaul. Second, backhaul involves the connection of a competing LEC customer's loop to the competing LEC's switch from which the customer draws dial tone that is transported over an entrance facility; it has nothing to do with calls placed to or by the competing LEC's customer with a "backhauled" dial-tone line. A competing LEC's customer with a "backhauled" dial-tone line can use that line to make any kind of telephone call, including long

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facility to permit its own customers to reach one another over the incumbent LECs network."); *see also Mich. Bell Tel. Co. v. Covad Commc'ns Co.*, 597 F.3d 370, 388 (6th Cir. 2010) (Sutton, J., dissenting) ("When used for backhauling, entrance facilities route traffic between two of the competitor's customers, likely because the competitor leases some elements of the incumbent's network, rather than between a customer of the competitor and a customer of the incumbent.").

42. *See, e.g., Pacific Bell*, 621 F.3d at 847 ("Where a competitive LEC uses an interconnection facility for backhaul, only the competitive LEC benefits—both the originator and the recipient of the call are competitive LEC customers."); Michigan Public Service Commission Br. at 27 (arguing that with backhauling "the network that the competitive carrier creates is really its own"); *id.* at 28-29.

distance, and to call any kind of customer, including: (i) customers served by the same competitor (who may or may not also have a "backhauled" dial-tone line); (ii) customers served by a different competitor; (iii) customers served by the incumbent; and (iv) customers served by wireless carriers. In each type of telephone call, the circuit that is "backhauled" is the loop connection from the competing LEC's customer to the competing LEC's switch that is transported over the entrance facility, regardless of the origin or destination of that call.

C. Entrance facilities are fundamentally different from other steps that incumbent LECs must take to facilitate interconnection.

The petitioners and some of their supporting *amici* argue that requiring incumbent LECs to provide entrance facilities at TELRIC rates under 47 U.S.C. § 251(c)(2) is consistent with the duties imposed upon incumbent LECs to facilitate interconnection.[43] This argument is flawed.

First, while an incumbent may be required to "modify" its facilities "to the extent necessary to accommodate interconnection," such modifications are dissimilar to requiring an incumbent to provide a competing LEC with entrance facilities.[44] A good example of the "modifications"

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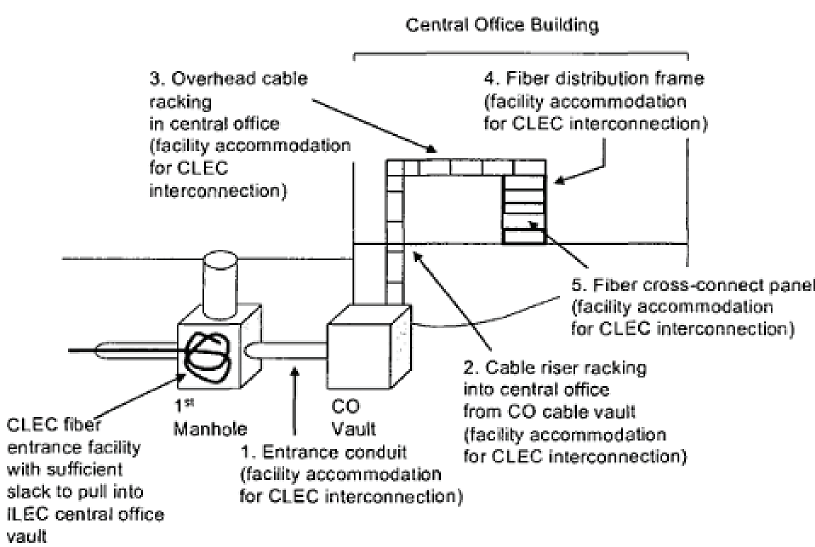
43. *See* Talk America Br. at 32-33; Michigan Public Service Commission Br. at 29-32; United States Br. at 24-25.

44. *Local Competition Order* at 15602-03, ¶ 198; *see also id.* at 15,605, ¶ 202 ("[T]he incumbent must accept the novel use of, and modification to, its network facilities to accommodate the interconnector."); *see* Michigan Public Service Commission Br. at 31 (arguing that "an obligation to modify facilities indicates a duty to build or change existing facilities").

an incumbent LEC may be required to make to its network involves the situation when a competing LEC self-provisions an entrance facility or obtains that facility from a third party. In such a situation, the competing LEC or third party will run the entrance facility fiber optic cable to a manhole near the incumbent's central office, and the incumbent in turn will perform certain activities in order to connect the entrance facility to its network. These activities are depicted in Figure 8.[45]

FIGURE 8:
ILEC Network Modifications
to Accommodate Interconnection



45. Figure 8 is reproduced from a brief filed with the Ninth Circuit in *Pacific Bell*. *See* Brief of Appellant AT&T California at 35, *Pacific Bell Tel. Co. v. Cal. Pub. Utils. Comm'n*, 621 F.3d 836 (9th Cir. June 27, 2008).

As reflected in Figure 8, to connect an entrance facility provided by a CLEC or a third party to the incumbent LEC's network, the incumbent will: (i) provide conduit in its cable vault through which to pull the competing LEC's fiber cable; (ii) furnish riser cables and overhead racking to extend the competing LEC's fiber cable into the incumbent's central office; (iii) terminate the competing LEC's fiber cable to a fiber distribution frame; and (iv) cross-connect the competing LEC's fiber cable with the incumbent's network.

All of the activities described above occur in the incumbent LEC's central office, and they largely utilize existing equipment and facilities in the incumbent LEC's network for which the competitor pays TELRIC rates. None of these activities are remotely comparable to the work required to provide a competing LEC with an entrance facility – namely, designing, engineering, constructing, and activating a new Fiber Optic Transport System. Indeed, the work necessary to deploy an entrance facility involves precisely the type of activities that the FCC has held an incumbent is not required to perform in connection with its unbundling obligations under Section 251(c)(3).[46]

46. Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, 18 F.C.C.R. 16,978, 17,374, 17,381, ¶¶ 636, 648 (2003) (determining that "no incumbent LEC is obligated to build out facilities at TELRIC pricing" or to "trench or place new cables for a requesting carrier"), *vacated in part and remanded*, *United States Telecom Ass'n v. FCC*, 359 F.3d 554 (D.C. Cir. 2004) (upholding determination that modification requirement does not include "construction of new wires").

Second, that the FCC requires an incumbent to establish meet point interconnection cannot reasonably be construed to require an incumbent to deploy entrance facilities at TELRIC rates.[47] In a meet point interconnection arrangement, "each party pays its portion of the costs to build out the facilities to the meet point."[48] Because a competing LEC must bear its own costs of construction of a meet point arrangement and because its ability to select the meet point location is constrained,[49] the competing LEC has little economic incentive to select a meet point that is located a considerable distance from its switch.[50]

However, these economic incentives would be seriously skewed if a competing LEC could obtain entrance facilities at TELRIC rates. For example, in Figure 5, the competing LEC switch located in Smyrna, Georgia is 8.3 miles from AT&T's Courtland Street central office. If the competing LEC operating that switch could pay TELRIC rates for

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47. *See* Michigan Public Service Commission Br. at 30-31; United States Br. At 24 .

48. *Local Competition Order* at 15,780-81, ¶ 553.

49. *Id.* (noting that meet point interconnection requires only "some" "limited build-out of facilities" as an "accommodation of interconnection" and that "the appropriate distance that would constitute the required reasonable accommodation of interconnection" should be left to the parties and state commissions).

50. *Cf. Triennial Review Remand Order* at 2611, ¶ 138 (noting that competing LECs "have a unique degree of control over the cost of entrance facilities" because "they often locate their switches close to the incumbent LEC's central office, minimizing the length and cost of entrance facilities").

AT&T to deploy and operate a fiber optic transport system that would cover the entire distance from Smyrna, Georgia to the Courtland Street, there would be little reason for the competing LEC to incur the actual cost of building out to a meet point and jointly operating a meet point arrangement.

Finally, in support of their claim that incumbents are required to provide entrance facilities in order to facilitate interconnection, the petitioners point to the incumbents' duty to provide "two-way trunking," which an incumbent must do upon request if technically feasible.[51] Trunks can be either one-way or two-way. On a one-way trunk, traffic is originated from only one side of the trunk, while traffic is originated from either side on a two-way trunk. However, like other circuits, a trunk rides on a transport facility, and the work required to provide two-way as opposed to one-way trunks on a particular transport facility is unrelated to and independent of the work required to design, engineer, and construct that transport facility. Provisioning one-way or two-way trunking is merely a matter of programming the two switches on either side of the trunk. Therefore, the activity involved in provisioning two-way trunks riding an entrance facility is grossly dissimilar as well as irrelevant to those required to deploy that transport facility, and the obligation to do the former cannot reasonably be used to justify the latter.

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51. 47 C.F.R. § 51.305(f); *see* Talk America Br. at 33-34 (citing 47 C.F.R. § 51.305(f) in support of the argument that "the FCC has ruled that the right to interconnection includes a competitor's right to obtain a physical facility from the ILEC for use in transmitting, i.e., exchanging, traffic between the two networks"); Michigan Public Service Commission Br. at 31.

CONCLUSION

This Court has before it an important case that can shape incentives in the deployment of the nation's communications infrastructure. Upon careful evaluation of the regulatory interpretations put forth by the parties and *amici*, keeping in mind the technical realities faced by incumbent and competing carriers around the country, the Court should affirm the Sixth Circuit's decision.

Respectfully submitted,

Megan L. Brown
Counsel of Record
Bennett L. Ross
J. Michael Connolly
Wiley Rein LLP
1776 K Street, N.W.
Washington, DC 20006
(202) 719-7000
mbrown@wileyrein.com

Jonathan B. Banks
United States Telecom Association
607 14th Street, N.W., Suite 400
Washington, DC 20005
(202) 326-7300

Attorneys for Amici Curiae

APPENDIX

APPENDIX — LIST OF NETWORK ENGINEERS

Donald E. Albert

Mr. Albert's telecommunications career spans more than 33 years. He has held positions with Verizon, Bell Atlantic, and the former C&P Telephone Companies. He has had a variety of assignments in engineering, operations, network planning, capital management, and sales. As Engineering Director of competitive LEC Implementation at Verizon, he was responsible for engineering issues associated with interconnection agreements between Verizon and competitive LECs, including the related modification and development of Verizon's engineering processes and procedures. He has testified as Verizon's engineering witness in approximately 100 proceedings before thirteen state regulatory authorities and the FCC involving Verizon's entry into the long distance market, Verizon and competitive LEC interconnection agreement arbitrations, and Verizon's TELRIC cost studies.

Mary T. Gray

Ms. Gray's telecommunications career spans more than 30 years. She had held positions with SBC and Southwestern Bell Telephone. As Director of Planning and Engineering at SBC, she coordinated federal and state regulatory filings involving networks, supported network projects with seven state public utility commissions, and formulated company policy and negotiated contracts with competing LECs.

W. Keith Milner

Mr. Milner's telecommunications career spans more than 40 years. He has held positions with, among others, Bell Communications Research, AT&T, and BellSouth. He has extensive experience in all phases of telecommunications network planning, deployment, and operations in both the domestic and international arenas. As Assistant Vice President, he testified before nine state regulatory authorities and the FCC on such issues as the technical capabilities of network facilities, new service offerings, expanded calling areas, unbundling of network facilities, and network interconnection.

Barry Orrel

Mr. Orrel's telecommunications career spans more than 22 years. Retiring as an Executive Director at Qwest Communications, he performed a variety of roles, including: Interoffice Facilities Planning Engineer, Central Office Toll Equipment Engineer, Digital Subscriber Loop Design Engineer, T1 Installation Project Manager, Interconnection Agreements Negotiator, and CLEC Collocation Project Manager. Additionally, he has provided oral and written testimony in various administrative jurisdictions, addressing such topics as network interconnection terms and conditions, support of engineering inputs for UNE loop TELRIC modeling, UNE unbundling, and wholesale loop installation/maintenance performance metrics.